CLEMSON EXTENSION

PLANT PATHOLOGY

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Managing Wirestem on Cole Crops

The Disease

Wirestem is a disease of young cole crop plants that affects both direct-seeded and transplanted crops. The primary symptom is dark lesions of varying depth and length on the hypocotyl (seedling stem) at or just above the soil line.

Secondary symptoms associated with lesions that encircle or girdle the stem include wilting, stunting, and a blue color to the youngest leaves. Moist soil may stick to the lesions, held there by strands of the fungus pathogen.

Dark, girdling stem lesions are a reliable symptom to diagnose wirestem.

Wirestem kills plants outright. Just as important, surviving plants may be stunted permanently and never produce a harvestable yield. Because of stand loss and stunted plants, wirestem reduces the number and weight of marketable-sized heads (cabbage, broccoli) or plants (collard) per acre.

Stand loss in cabbage caused by severe wirestem.

The Pathogen

Rhizoctonia solani is the soilborne fungus that causes wirestem. This pathogen also causes pre-emergence damping-off of cole crops and bottom rot of cabbage. In the southeastern United States, the most prevalent and damaging type of *R. solani* that attacks cole crops is type AG 4. Because AG 4 attacks a wide variety of vegetables and is adapted to survive in soil, crop rotation often will not control wirestem.

Another type of *R. solani*, AG 2-1, also causes wirestem. It is usually found on farms that grow cole crops repeatedly in the same fields, as this type of *R. solani* prefers to attack cole crops.

Favorable Conditions

In the southeastern United States, wirestem is more common and severe in the fall than in the spring. This is because the pathogen is most active in warm, moist soil.

Green legume crops, such as clovers, vetches, and beans, increase the amount and activity of *Rhizoctonia* in soil by providing a food base for the fungus. High soil nitrogen levels enable *Rhizoctonia* to attack plant stems quickly. Excess nitrogen also makes plants more tender and susceptible.

The Host Crop

Several cole crop vegetables are very closely related, including cabbage, collard, and kale. Because all of these crops are in the species *Brassica oleracea*, they are all susceptible to wirestem. Other cruciferous vegetables, such as mustard, turnip, and rutabaga, belong to different *Brassica* species and are less susceptible than *B. oleracea* is. All cruciferous vegetables become less susceptible as their stems thicken with age.

Management

Soil Preparation before Planting

- Choose a well-drained field and use raised beds.
- Deep plow to turn over the top 6 inches of soil, which has the highest level of *R. solani*.
- Soil solarization, or solar heating of soil, will kill *R. solani* in the top 4 inches of soil. Cover moist soil with clear plastic for 8 weeks in June to August before planting a fall crop. Use minimal tillage at planting to avoid reinfesting solarized soil.
- Use rye or other small grains as rotation crops.

At Planting

- Grow less susceptible cultivars of cole crops. Some examples are 'A&C No. 5+' cabbage, 'Blue Max' collard, 'Viking' broccoli, 'Arctic' cauliflower, and 'Tendergreen' mustard. Avoid 'Gourmet' cabbage, as it is very susceptible.
- Fertilize transplants as little as possible or not at all before transplanting. Nitrogen delays hardening of transplants and can make them more susceptible to wirestem.
- **Do not set transplants too deeply into the soil.** Cover only the root ball and as little of the stem as possible. This is the most important cultural practice to prevent wirestem.
- Apply the chemical PCNB to soil. Check the fungicide label or http://cufan.clemson.edu/pestmgmtguide for application directions.

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